

## CLAIMS

What is claimed is:

1. A method for reallocating bandwidth used by a data tributary comprising data units during transport of said data tributary over a communications link by a time division multiplexing (TDM) frame from a source device to a sink device, each said data unit occupying one time slot of said frame and said data units being encoded to differentiate between payload data and control codes, said method comprising:

(a) at said source device, inserting a designated code in each unallocated time slot to identify that said time slot contains no payload data;

(b) determining new set(s) of time slots to be allocated or de-allocated to said tributary;

(c) communicating to said sink device said new set(s) of time slots;

(d) receiving confirmation of said communication from said sink device;

(e) if said new set(s) of time slots are being allocated to said tributary, inserting said data units into said new set(s) of time slots allocated to said tributary; and,

(f) if said new set(s) of time slots are being de-allocated to said tributary, discontinuing insertion of said data units into said new set(s) of time slots de-allocated to said tributary;

(g) whereby said inserting or discontinuing insertion of data units into said new set(s) of time slots commences upon said confirmation receipt.

2. A method according to claim 1 whereby said TDM frame is a SONET frame and said set(s) of time slots are STS-1s.

3. A method according to claim 2 whereby said designated codes are ignored by said sink device.

4. A method according to claim 3 whereby said inserting of said designated codes is performed by a mapper of said source device and said designated codes are terminated in a demapper of said sink device.

5. A method according to claim 4 whereby said new set(s) of time slots are allocated to said data tributary whereby said bandwidth of said tributary is increased.

6. A method according to claim 4 whereby said new set(s) of time slots are de-allocated to said data tributary whereby said bandwidth of said tributary is decreased.

7. A method according to claim 2 whereby each said data unit comprises 9 bits consisting of an 8 bit information octet, being either a control octet or a data octet, and one octet type bit identifying said octet as control or data, said data units being mapped, in a cyclic manner, into each said new STS-1 allocated thereto by mapping said information octets of each sequence of 8 data units to eight of a sequence of nine contiguous timeslots of each said new STS-1 and mapping said octet type bits for each said mapped sequence of information octets to a ninth octet of said contiguous time slots of each said new STS-1.

8. A method according to claim 2 whereby said data tributary is encoded according to HDLC protocol and said designated code is escaped where it appears in payload data units.

9. An apparatus within a mapper/demapper for reallocating bandwidth used by a data tributary comprising data units during transport of said data tributary over a communications link by a time division multiplexing (TDM) frame from a source device to a sink device, each said data unit occupying one time slot of said frame and said data units being encoded to differentiate between payload data and control codes, each said source and sink devices comprising said apparatus, said apparatus comprising:

(a) a designated code generator configured for generating and inserting into each unallocated time slot a designated code to identify that said time slot contains no payload data;

(b) a bandwidth re-allocation identifier configured for identifying new set(s) of time slots to be allocated or de-allocated to said tributary;

(c) a bandwidth re-allocation signaller configured for communicating to said sink device said new set(s) of time slots and for receiving confirmation of said communication from said sink device;

(d) a data unit inserter configured for inserting said data units into said new set(s) of time slots allocated to said tributary, if said new set(s) of time slots are being allocated to said tributary, and for discontinuing insertion of said data units into said new set(s) of time slots de-allocated to said tributary, if said new set(s) of time slots are being de-allocated to said tributary, wherein said inserting or discontinuing insertion of data units into said new set(s) of time slots is commenced upon said confirmation receipt.

10. An apparatus according to claim 9 wherein said TDM frame is a SONET frame and said set(s) of time slots are STS-1s.

11. An apparatus according to claim 10 configured to ignore said designated codes received at said sink device.

12. An apparatus according to claim 11 wherein said bandwidth of said tributary is increased when said new set(s) of time slots are allocated to said data tributary.

13. An apparatus according to claim 11 wherein said bandwidth of said tributary is decreased when said new set(s) of time slots are de-allocated to said data tributary.

14. An apparatus according to claim 10 wherein each said data unit comprises 9 bits consisting of an 8 bit information octet, being either a control octet or a data octet, and one octet type bit identifying said octet as control or data, said apparatus further comprising a cyclical mapping component configured for mapping said data units, in a cyclic manner, into each said new STS-1 allocated thereto whereby said information octets of each sequence of 8 data units are mapped to eight of a sequence of nine contiguous timeslots of each said new STS-1 and said octet type bits for each said mapped sequence of information octets is mapped to a ninth octet of said contiguous time slots of each said new STS-1.

15. An apparatus according to claim 10 in combination with an HDLC encoder/decoder configured to escape said designated code where it appears in payload data units.

WORKMAN, NYDEGGER & SEELEY  
A PROFESSIONAL CORPORATION  
ATTORNEYS AT LAW  
1000 EAGLE GATE TOWER  
60 EAST SOUTH TEMPLE  
SALT LAKE CITY, UTAH 84111